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Reduced Culpability Without Reduced Punishment: A Case for Why Lead Poisoning Should be Considered a Mitigating Factor in Criminal Sentencing

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REDUCED CULPABILITY WITHOUT REDUCED PUNISHMENT: A CASE FOR WHY LEAD POISONING SHOULD BE CONSIDERED A MITIGATING FACTOR IN CRIMINAL SENTENCING

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The water crisis in Flint, Michigan, where residents discovered dangerous levels of lead in their water supply in 2015, has continued to unfold over the past three years and has brought the damaging effects of lead exposure to national attention. When developing children are exposed to even low levels of lead, they are at risk of developing cognitive impairments—disorders that cause aggressive behavior and diminished intellectual functioning. This Comment seeks to bring criminal law into the conversation about lead exposure and its damaging effects. Researchers have found that children exposed to lead have a higher risk of engaging in criminal behavior. But the neurological impact of lead exposure in children suggests these children may not possess the culpability that traditionally justifies criminal punishment. This Comment proposes that, in accordance with the utilitarian and retributive goals of criminal law, evidence of lead exposure and resulting brain damage be considered mitigating factors in sentencing.

TABLE OF CONTENTS

INTRODUCTION.....	570
I. LEAD POISONING AND DELINQUENCY.....	576
II. BRIEF HISTORY OF LEAD CONTAMINATION IN URBAN COMMUNITIES	579

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A. Flint Water Crisis.....	580
B. Lead Contamination Nationwide.....	581
III. LEAD POISONING SHOULD MITIGATE PUNISHMENT IN CRIMINAL SENTENCING.....	582
A. Consideration of Lead Poisoning Within Theories of Punishment	583
B. Neuroscience in the Law: Precedent and Justification	585
C. Lead Poisoning as Mitigation in Capital Cases	588
D. Mitigating Factors in State Sentencing Schemes in Non-Capital Cases	589
1. Michigan	590
2. Illinois	590
3. Indiana.....	592
4. Ohio.....	592
CONCLUSION.....	593

INTRODUCTION

The ongoing water crisis in Flint, Michigan, following the discovery of lead in the city's water supply in 2015, is evidence that dangerous amounts of lead persist in urban environments. Despite decades of efforts to remove the toxic metal from homes, soil, and water, cities throughout the United States continue to have serious lead contamination, especially in homes and soil.¹ Lead contamination is so common that the Centers for Disease Control and Prevention (CDC) estimates that approximately 500,000 children ages one through five who live in the United States have blood lead levels greater than 5 ug/dL, the quantity that triggers concern from medical professionals and poses a risk of danger to children.² Lead is a neurotoxin,³ and the detrimental effects of lead exposure on developing children are well documented by researchers who have found that the presence of lead in the body may damage organs and cause serious behavioral disorders and

¹ See *infra* Part III.

² *Lead*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nceh/lead/> (last visited May 4, 2018). Blood lead levels are commonly measured by micrograms (ug) of lead per deciliter (dL) of blood, and according to the CDC, children with 5 ug/dL or greater have much higher levels of lead than most children. *What Do Parents Need to Know to Protect Their Children?*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/nceh/lead/acclpp/blood_lead_levels.htm (last visited May 17, 2017).

³ Black's Medical Dictionary defines neurotoxin as a "chemical substance that harms nervous tissue, causing symptoms of numbness or weakness of the body part supplied by the damaged . . . Arsenic and lead are examples of inorganic neurotoxins." *Neurotoxin*, BLACK'S MED. DICTIONARY (H. Marcovitch ed., 42d ed. 2010).

intellectual disabilities.⁴ Even small quantities of lead can cause learning disabilities, low intelligence quotient (IQ), and anti-social behaviors.⁵ Though doctors do not become concerned until blood lead levels reach 5 ug/dL, the CDC claims that there is no safe blood lead concentration.⁶

Environmental and public health organizations have been the primary responders to concerns about lead exposure and have focused on lead poisoning prevention.⁷ However, the neurological damage caused by lead implicates the criminal justice system as well. Many studies have linked low IQ and behavioral disorders to an increased risk of criminal behavior.⁸ Thus, individuals poisoned by toxic lead exposure are more likely to become involved in the criminal justice system than individuals without blood lead levels that result in neurological damage.⁹

Because the deterrence and retribution goals of criminal law rely on the premise that people make decisions of their own free will, and therefore can be held responsible for their actions, criminal law has been hesitant to give legal effect to mental or behavioral impairments.¹⁰ However, this Comment argues that the law should account for the role that lead poisoning may play in the behavior of a criminal defendant. Specifically, lead poisoning should mitigate punishment in the sentencing stage of criminal cases to reflect the lesser culpability of offenders acting with diminished capacity.

The Flint water crisis began in April 2014 when the city switched its water supply source to the Flint River in order to save money.¹¹ Although residents almost immediately started complaining about the smell and color of the water, residents did not discover the high content of lead until the city tested the water in February 2015.¹² Despite the Environmental Protection

⁴ *Lead Poisoning and Health*, WORLD HEALTH ORG., <http://www.who.int/mediacentre/factsheets/fs379/en/> (last visited Feb. 9, 2018).

⁵ *Id.*

⁶ *Childhood Lead Poisoning Data, Statistics, and Surveillance*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nceh/lead/data/index.htm> (last visited Apr. 11, 2018).

⁷ For examples of the efforts made by environmental organizations, see *Lead Renovation, Repair and Painting Program*, ENVTL. PROTECTION AGENCY, <https://www.epa.gov/lead/renovation-repair-and-painting-program> (last visited Nov. 5, 2017). For examples of efforts made by public health groups, see *Lead*, *supra* note 2.

⁸ See *infra* Part II.

⁹ See *infra* Part II.

¹⁰ See *infra* Part IV.

¹¹ Merrit Kennedy, *Lead-Laced Water in Flint: A Step-by-Step Look at the Makings of a Crisis*, NAT'L PUB. RADIO (Apr. 20, 2016), <http://www.npr.org/sections/thetwo-way/2016/04/20/465545378/lead-laced-water-in-flint-a-step-by-step-look-at-the-makings-of-a-crisis>.

¹² *Id.*

Agency's concerns about the lead levels, city officials told residents they could "relax."¹³ After additional testing of Flint's water supply and children's blood lead levels in September 2015, the city switched back to its previous water supplier in Detroit.¹⁴ The investigation into Flint's contaminated water supply continues today, and safety concerns about the drinking water are not yet fully resolved.¹⁵

Following the Flint water crisis, the prevalence of lead poisoning has been recognized nationwide in the media.¹⁶ Given society's present interest in addressing the high costs of mass incarceration in the United States, the impact lead poisoning may have on the criminal justice system has received particular attention. Carimah Townes of ThinkProgress.org published a provocative article titled *How the Flint Water Crisis Could Send an Entire Generation to Prison*, which addressed the link between lead exposure and delinquency, and the risks the city's water contamination presents to Flint's children.¹⁷ The title may exaggerate the impact of the Flint crisis, as data shows that just 4% of children living in Flint tested for lead showed elevated blood lead levels,¹⁸ but the article reflects the sentiment that the criminal justice system should give serious consideration to the role lead plays in criminal behavior.¹⁹ Though criminal law does not currently afford much, if any, weight to lead poisoning, the attention given to lead contamination in homes and water systems nationwide in reaction to Flint's disaster presents a timely opportunity to consider the role lead poisoning should play as a mitigating factor in sentencing.²⁰

This Comment explores many reasons why lead poisoning should mitigate criminal punishment. Following this section's overview of the re-emergence of lead poisoning concerns and previous scholarship on criminal law's consideration of lead poisoning, Part II surveys the medical and

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Liam Stack, *Lead Levels in Flint Water Drop, but Residents Still Can't Drink It*, N.Y. TIMES (Jan. 24, 2017), https://www.nytimes.com/2017/01/24/us/flint-michigan-water.html?_r=1.

¹⁶ *See infra* Part II.

¹⁷ Carimah Townes, *How the Flint Water Crisis Could Send an Entire Generation to Prison*, THINKPROGRESS (Jan. 22, 2016, 3:58 PM), <https://thinkprogress.org/how-the-flint-water-crisis-could-send-an-entire-generation-to-prison-10f681ceab7d#.1lm0hp4gb>. In reaching this conclusion, Townes referenced a statement released by Flint's mayor that lead's "damage to children is irreversible and can cause effects to a child's IQ, which will result in learning disabilities . . . and an increase in the juvenile justice system." *Id.*

¹⁸ Kennedy, *supra* note 11.

¹⁹ Townes, *supra* note 17.

²⁰ *See infra* Part IV.

environmental studies that link lead to adverse health consequences, with emphasis on studies that examine the behavioral and intellectual damage lead causes. Of particular importance to criminal law is the data that directly links lead poisoning to criminal behavior and increased likelihood of an individual's involvement with the criminal justice system.²¹ These studies are numerous and suggest that the relationship between lead poisoning and delinquency is well supported and generally uncontested by researchers. Next, Part III presents data on the continued presence of lead in urban communities and the ongoing lead removal efforts throughout the United States. This data shows that lead remains a serious problem in many cities and affects a significant number of children every year.

Part IV calls on states to develop sentencing schemes that compel courts to consider evidence of neurological damage caused by lead exposure. This would be supported by the Supreme Court's increasing reliance on neuroscience in determining the criminal responsibility of juvenile offenders, as well as its recognition of the importance of mitigating factors, including lead poisoning, in the sentencing stage of capital cases.²² This part will show that extending consideration of lead poisoning as a mitigating factor to non-capital cases is appropriate and justified under both retributive and utilitarian theories of punishment.²³

The sentencing schemes in some states currently preclude lead poisoning as a mitigating factor, while other states' schemes suggest that diminished intellectual capacity, which is just one consequence of lead poisoning, may be considered.²⁴ However, consideration of all the effects of lead poisoning, including aggression and impulsivity, does not seem to be explicitly authorized by state sentencing schemes.²⁵ Moreover, it is not clear in practice how often defense attorneys investigate claims of lead poisoning or raise them to the court. A sentencing scheme that explicitly accounts for lead poisoning would put defense attorneys and courts on notice to investigate childhood lead poisoning, thereby ensuring that such evidence is fairly accounted for in determining the criminal responsibility and

²¹ E.g., John Paul Wright et al., *Association of Prenatal and Childhood Blood Lead Concentrations with Criminal Arrests in Early Adulthood*, 5 PLOS MEDICINE 732 (2008). Part II will further discuss studies on lead poisoning and criminal behavior.

²² E.g., *Miller v. Alabama*, 567 U.S. 460 (2012); AM. BAR ASS'N, GUIDELINES FOR THE APPOINTMENT AND PERFORMANCE OF DEFENSE COUNSEL IN DEATH PENALTY CASES 1.1—OBJECTIVE AND SCOPE OF GUIDELINES (2003).

²³ See *infra* Part IV.

²⁴ See *id.*

²⁵ E.g., 730 ILL. COMP. STAT. ANN. 5/5-5-3-1 (2004); IND. CODE ANN. § 35-38-1-7.1(b)(4) (LEXISNEXIS (2015)); OHIO REV. CODE ANN. § 2947.06 (2011). Part IV will further discuss these statutes.

appropriate punishment for individuals affected by lead exposure.

Consideration of lead poisoning in criminal law is not a novel proposal. Consistent with the well-established practice of considering an offender's exposure to neurotoxins during the sentencing stage of death penalty eligible cases, at least one scholar has contemplated the use of lead poisoning as a criminal defense in lesser offenses. In 1993, Professor Deborah Denno raised the possibility of allowing defendants to present lead poisoning evidence as a complete defense to a charged crime.²⁶ Denno relied on the "Biosocial Study" that tracked the criminal history of 487 black male children born at Philadelphia's Pennsylvania Hospital between 1959 and 1962, which concluded that lead poisoning was one of three factors that significantly increased the risk of school disciplinary problems and involvement in the criminal justice system.²⁷ Though Denno argued that the study's link between lead exposure and criminal behavior so strongly implicated our understanding of criminal responsibility that lead poisoning could be presented as a criminal defense, she ultimately rejected the proposition that it necessarily should be in the interest of fairness.²⁸

Denno considered lead to be an external or environmental factor, noting that "it remains to be considered the extent to which some environmental forces, such as lead poisoning, produce internal disorders, such as neurodevelopmental delay"²⁹ She also expressed concern for defendants whose defense attorneys were unfamiliar with the effects of lead poisoning.³⁰ Thus, Denno concluded that while lead poisoning should be considered in determining whether a criminal defendant has an insanity defense, individuals with less serious disorders, such as lead poisoning that causes damage not amounting to insanity, have a level of criminal responsibility similar to that of sane individuals.³¹

The proposition that evidence of neurotoxic damage, including damage from lead poisoning, may support a complete defense was also put forth in a comment by Charell Arnold that explored the success of such defenses.³² The comment suggested that because a neurotoxin defense is essentially a defense

²⁶ Deborah Denno, *Considering Lead Poisoning as a Criminal Defense*, 20 FORDHAM URB. L.J. 377, 394 (1993).

²⁷ *Id.* at 379–80, 384–85.

²⁸ *See id.* at 399.

²⁹ *Id.* at 397.

³⁰ "Consider, however, the disadvantages faced by those attorneys who are not so knowledgeable about the consequences of externally produced events." *Id.*

³¹ *Id.* at 399.

³² *See generally* Charell D. Arnold, Comment, *At Nature's Mercy: The Uneasy Courtship of Criminal Defense and the Environment*, 25 TUL. ENVTL. L.J. 453 (2012).

of diminished capacity, there are three ways in which lead poisoning could operate as a defense: negation of mens rea, the defense of automatism, and involuntary intoxication from exposure to neurotoxins.³³ However, Arnold notes how difficult it is to mount a neurotoxin poisoning defense.³⁴ For example, Arnold contrasts a case in which uranium poisoning caused the defendant such severe brain damage that defense counsel was able to mount a successful insanity defense³⁵ to a case in which the defense failed because carbon monoxide poisoning had only temporary effects and the defendant had no way to prove he was poisoned during the commission of his offense.³⁶

In addition to considering its use as a criminal defense, Arnold addresses the use of lead poisoning as mitigation in capital cases,³⁷ but does not examine the justification for such mitigation in a non-capital sentencing context. This Comment supplements Arnold's analysis by arguing that lead poisoning be considered as a mitigating factor in sentencing, an important distinction from Denno's complete defense theory. Though extreme cases of lead poisoning may result in complete intellectual disability or death, Part II will show that in many cases where children have low but still toxic blood lead levels, the consequences are significant but do not rise to the level of insanity.³⁸

In response to Denno's rejection of lead poisoning as a criminal defense, lead poisoning would be best considered not as a complete defense, but rather as one contributing factor to an individual's delinquency that should be

³³ "In general, a diminished capacity argument may take on several forms, including pleading: (1) the defendant's incapacity to formulate the requisite mens rea necessary to prove a given crime; (2) the defendant's inability to regulate his own behavior, a defense otherwise known as automatism; (3) or arguing the defendant's exposure to toxins constitutes a form of involuntary intoxication." *Id.* at 455.

³⁴ *Id.* at 460 (explaining that a defendant must show not only that an environmental toxin was present in his body but also that there is a causal relationship between the toxin and the defendant's diminished capacity).

³⁵ *Id.* at 462–63.

³⁶ "Unlike lead, and many other environmental toxins, there is no long-term test for carbon monoxide exposure—meaning that once Frank's attorneys were alerted to the possibility for such a defense, too much time had already passed since the incident to conduct another blood test." *Id.* at 459–61.

³⁷ "This use of mitigation is most prevalent within death penalty proceedings, wherein the guilt and sentencing phases are bifurcated." *Id.* at 464.

³⁸ According to the federal insanity defense,

It is an affirmative defense to a prosecution under any Federal statute that, at the time of the commission of the acts constituting the offense, the defendant, as a result of a severe mental disease or defect, was unable to appreciate the nature and quality or the wrongfulness of his acts. Mental disease or defect does not otherwise constitute a defense.

18 U.S.C. § 17 (2012).

considered in determining a fair punishment in many or most cases. Expanding on Arnold's rationale for allowing mitigation in death penalty cases—the diminished culpability of the defendant—such mitigation should extend to lesser criminal offenses as well, in the interest of maintaining individually tailored punishment that is proportionate to the crime and the culpability of the offender.

Since Denno's article was published in 1993, advances in neuroscience have clarified that lead poisoning affects the brain and body to such a degree that it is considered an internal rather than external condition.³⁹ This subsequent scientific data answers Denno's concern that only those attorneys familiar with the internal effects of external events, like lead poisoning, would be effective in raising a lead poisoning defense.⁴⁰ The science is now well-established and readily available to prove that lead becomes internalized in the form of diminished IQ and behavioral disabilities.⁴¹ This makes it necessary to consider lead poisoning in order to have a complete and fair evaluation of an offender. This Comment's focus on lead poisoning specifically distinguishes this proposal from Arnold's discussion of neurotoxins generally because lead poisoning in children accumulates in the bones.⁴² Lead poisoning therefore may not present the same difficulties in evidentiary proof that Arnold discusses.⁴³ The widespread and well-documented prevalence of lead poisoning,⁴⁴ and the medical and scientific data on its permanent effects, have eliminated many of the barriers that may have previously precluded consideration of lead in criminal sanctions.

I. LEAD POISONING AND DELINQUENCY

National concerns about the presence of lead in homes and water are based on the devastating and irreversible damage that lead has on the brains and nervous systems of developing children.⁴⁵ The Environmental Protection Agency (EPA) acknowledged the impact of lead in the body in its Emergency Order issued in response to the Flint water crisis:

³⁹ See *infra* Part II.

⁴⁰ Denno, *supra* note 26, at 397.

⁴¹ See *infra* Part II.

⁴² *Public Health Statement for Lead*, AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY, <https://www.atsdr.cdc.gov/phs/phs.asp?id=92&tid=22#bookmark04> (last visited Jan. 21, 2018).

⁴³ *Id.*

⁴⁴ *Lead*, *supra* note 2.

⁴⁵ Abby Goodnough & Diantha Parker, *The Facts about Lead Exposure and Its Irreversible Damage*, N.Y. TIMES (Jan. 29, 2016), <http://www.nytimes.com/2016/01/30/us/lead-poisoning.html>.

Lead exposure across a broad range of blood levels has been associated with a spectrum of patho-physiological effects, including interference with heme synthesis necessary in the formation of red blood cells, anemia, kidney damage, impaired reproductive function, interference with vitamin D metabolism, impaired cognitive performance . . . delayed neurological physical development, and elevation in blood pressure.⁴⁶

While all of these health problems are concerning, the impact lead has on cognitive functioning and neurological development is of particular interest to the criminal justice system because of the important role that an offender's state of mind and moral culpability play in determining appropriate criminal sanctions.⁴⁷

Lead can impair the IQ of developing children. A 2013 study of two- and three-year-old children found that blood lead levels of 50 ug/L in children can "impair growth, memory, intelligence, and behavior, even when there is no obvious clinical manifestation" and that "the intelligence quotient of children is inversely proportional to their blood lead level."⁴⁸ However, even far lower levels of blood lead concentration can have a significant impact on brain development. A 2003 study found that children with lead levels of 10 ug/dL or less experienced intellectual deficits, with some children showing a decline in IQ by up to 7.4 points.⁴⁹ In 2014, researchers studied the impact of lead exposure on preschool children's emotions and behavior specifically.⁵⁰ They found that every "1 ug/dL increase in blood lead concentration" within the tested ranges resulted in an increase of "emotional reactivity, anxiety problems, and pervasive developmental problems."⁵¹

Diminished IQ and increased behavior disorders have important implications for the criminal justice system. Research has established that there is a correlation between children with impaired intellectual function or behavioral disorders and those found to be delinquent.⁵² For example,

⁴⁶ ENVTL. PROTECTION AGENCY, EMERGENCY ADMINISTRATIVE ORDER 6 (Jan. 21, 2016), https://www.epa.gov/sites/production/files/2016-01/documents/1_21_sdwa_1431_emergency_admin_order_012116.pdf [hereinafter EPA ORDER].

⁴⁷ See generally Douglas A. Berman & Carissa Byrne Hessick, *Towards a Theory of Mitigation*, 96 B.U. L. REV. 161 (2016).

⁴⁸ Shuangzing Hou et al., *A Clinical Study of the Effects of Lead Poisoning on the Intelligence and Neurobehavioral Abilities of Children*, 10 THEORETICAL BIOLOGY & MED. MODELLING 1, 2 (2013).

⁴⁹ Richard L. Canfield et al., *Intellectual Impairment in Children with Blood Lead Concentrations Below 10 ug per Deciliter*, 348 NEW ENG. J. MED. 1517, 1521 (2003).

⁵⁰ See Jianghong Liu et al., *Blood Level Concentrations and Children's Behavioral and Emotional Problems: A Cohort Study*, 168 JAMA PEDIATRICS 737, 737 (2014).

⁵¹ See *id.* at 739.

⁵² See generally Terrie E. Moffitt & Phil A. Silva, *Self-Reported Delinquency, Neuropsychological Deficit, and History of Attention Deficit Disorder*, 16 J. ABNORMAL CHILD PSYCHOL. 553, 560 (1988).

researchers Moffitt and Silva studied a random group of 678 thirteen-year-olds, and found that children with attention deficit disorder (ADD) were at greater risk than children without ADD to be delinquent, with 58% of thirteen-year-olds with ADD found delinquent.⁵³ Thus, research showing the link between lead poisoning and diminished IQ and behavioral disorders allows for a reasonable inference that lead poisoning correlates with criminal behavior.

But that inference is unnecessary because some studies have directly examined the link between delinquency and lead exposure. A 2008 study from the Cincinnati Children's Environmental Health Center and the University of Cincinnati Division of Criminal Justice shows that blood lead concentrations are associated with higher rates of total arrests, and specifically with higher rates of arrests for violent offenses.⁵⁴ The study measured the blood lead levels of 250 children over the course of several years, from birth to the age of six, and also tracked the number of criminal arrests each participant had after turning eighteen.⁵⁵ These children were selected because they lived in areas of the city with older homes with concentrated lead contamination.⁵⁶ The results showed that the association between blood concentrations and the number of arrests was statistically significant, and therefore, the researchers concluded that prenatal and childhood blood concentrations were predictors of adult arrests.⁵⁷ Specifically, the data showed that as the blood concentration level increased during the first six years, so did the number of arrests upon reaching adulthood.⁵⁸

Another study conducted by health economics professor Jessica Reyes also found a positive correlation between lead exposure and violent crime.⁵⁹ According to the research, "[t]hese results suggest that childhood lead exposure is significantly associated with violent crime. Based on these estimates, the fall in gasoline lead would be responsible for a 56% drop in violent crime between 1992 and 2002."⁶⁰ The links between lead poisoning,

⁵³ See *id.* at 553, 555–56.

⁵⁴ See Wright et al., *supra* note 21, at 732.

⁵⁵ See *id.* at 732–33. Note that the study looked at the number of arrests rather than the number of criminal convictions, under the theory that arrest is a more proximate measure of criminal behavior than convictions. *Id.* at 733–34. Arrests were tracked by gathering public data from computer records and did not rely on self-reporting. *Id.* at 734.

⁵⁶ *Id.* at 732.

⁵⁷ *Id.* at 736.

⁵⁸ See *id.* at 740.

⁵⁹ See Jessica Wolpaw Reyes, *Environmental Policy as Social Policy? The Impact of Childhood Lead Exposure on Crime*, 7 B.E. J. ECON. ANALYSIS & POL'Y, 1, 1, 27 (2007).

⁶⁰ *Id.*

impaired neurological functioning, and the risk of delinquency demonstrated by these studies call into question the criminal responsibility of those lead-poisoned individuals who go on to commit crimes. The overwhelming evidence that lead poisoning contributes to criminal behavior mandates that courts consider lead poisoning as a mitigating factor for all criminal offenses, not just capital offenses.

II. BRIEF HISTORY OF LEAD CONTAMINATION IN URBAN COMMUNITIES

Children in cities across the country are exposed to hazardous lead, and they have been for decades. Environmental and health concerns about lead emerged in the 1970s. Efforts to remove lead from the environment began with the federal Lead-Based Paint Poisoning Prevention Act in 1971,⁶¹ followed by a complete ban on the use of lead paint in homes in 1978.⁶² Despite these actions, lead remains present in homes and communities through old lead-based pipes, deteriorating lead paint, and lead in the soil.⁶³ Children are most likely to consume lead by ingesting peeling lead paint chips, dust produced by deteriorating lead paint, and lead-contaminated soil.⁶⁴ Recent estimates indicate that “about 37 million homes and apartments still have some lead paint on walls and woodwork, 23 million with potentially hazardous levels of lead in soil, paint chips, or household dust.”⁶⁵ The CDC further estimates that children live in about four million of these homes.⁶⁶

Congress also enacted a statute designed to promote lead removal from homes painted before 1978.⁶⁷ In response to the risks posed by lead contamination, Congress passed the Toxic Substances Control Act to provide children in homes and daycare facilities protection from lead exposure.⁶⁸

⁶¹ See generally Lead-Based Paint Poisoning Prevention Act, Pub. L. No. 91-695, 1971 U.S.C.C.A.N. (84 Stat.) 2078 (1971).

⁶² *Protect Your Family from Exposures to Lead*, ENVTL. PROT. AGENCY, <https://www.epa.gov/lead/protect-your-family-exposures-lead#main-content> (last visited Apr. 11, 2018).

⁶³ See *id.*

⁶⁴ See *id.*

⁶⁵ Michael Wines, *Flint is in the News, but Lead Poisoning is Even Worse in Cleveland*, N.Y. TIMES (Mar. 3, 2016), <http://www.nytimes.com/2016/03/04/us/lead-paint-contamination-persists-in-many-cities-as-cleanup-falters.html>.

⁶⁶ See *Childhood Lead Poisoning Fact Sheet*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nceh/publications/factsheets/ChildhoodLeadPoisoning.pdf> (last visited Apr. 11, 2018).

⁶⁷ See 42 U.S.C. § 4822 (2012).

⁶⁸ See generally Toxic Substances Control Act, Pub. L. No. 94-469, 1976 U.S.C.C.A.N. (90 Stat. 2003) of 1976, 94 P.L. 469.

Many state laws and municipal ordinances similarly seek to protect people from lead exposure.⁶⁹ A Chicago ordinance states that “[i]t is the duty of every owner of a dwelling, residential building, child care facility, or school to maintain the dwelling, residential building, child care facility, or school in such a manner so as to prevent the existence of a lead hazard.”⁷⁰ The consequences for violations of this ordinance are significant: penalties may include a fine of up to \$500 per day of non-compliance, and any person found guilty of a third violation or who fails to comply with court orders within two years may be subject to imprisonment for six months and will be fined up to \$1,000.⁷¹ Chicago’s laws, and similar laws throughout the United States, reflect the severity of the damage lead can cause children and the responsibility the law takes in preventing future harmful lead exposure. Despite these efforts, the Flint water crisis provides evidence that high levels of lead contamination persist today.

A. FLINT WATER CRISIS

Flint residents discovered lead in their water supply in February 2015.⁷² A test conducted by the city of one home’s contaminated water revealed a lead content of 104 parts per billion, far exceeding the EPA’s standard of 15 parts per billion maximum as a “safe” level of lead in drinking water.⁷³ Unsurprisingly, the child living in that home was diagnosed with lead poisoning just two months later.⁷⁴ That same month, another study conducted by researchers at Virginia Polytechnic Institute and State University found significantly higher levels of lead in Flint’s water—13,200 parts per billion.⁷⁵ In September 2015, children were tested for lead poisoning, and 4% of Flint children age five and under were found to have elevated levels of lead in their blood.⁷⁶ Before the water crisis, an estimated 2% of children had elevated blood lead levels;⁷⁷ thus, the contaminated water nearly doubled the number of children with lead poisoning.

These findings have resulted in serious concerns both in Flint and

⁶⁹ See, e.g., OHIO REV. CODE § 3742; see also MICH. COMP. LAWS § 333.5475(a); 32 IND. ADMIN. CODE 410:32 (1999).

⁷⁰ Chicago, Ill., Mun. Code § 7-4-030 (2006).

⁷¹ Chicago, Ill., Mun. Code § 7-4-120 IV A (2006).

⁷² See Kennedy, *supra* note 11.

⁷³ *Id.*

⁷⁴ Lead poisoning occurs when lead builds up in the body, often over months or years. *Lead Poisoning*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/lead-poisoning/symptoms-causes/syc-20354717> (last visited Jan. 21, 2018).

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

nationally. In September 2015, the city issued a lead advisory, and in December 2015, Flint's mayor declared a state of emergency.⁷⁸ In January 2016, Michigan's governor declared a state of emergency.⁷⁹ President Obama then declared a federal state of emergency in Flint and authorized the Federal Emergency Management Agency (FEMA) to provide water and other necessary resources to Flint residents affected by lead.⁸⁰ In the same month, the EPA issued an Emergency Administrative Order authorizing the EPA to take action in Flint following the city's inadequate response to the crisis and the persistent levels of lead in the water.⁸¹

B. LEAD CONTAMINATION NATIONWIDE

Following the crisis in Flint, the national media has uncovered many cities that have suffered from lead exposure for decades, including Cleveland; Baltimore; East Chicago, Indiana; and Washington, D.C. Nationally, 7.7% of African-American children younger than six years old have blood lead levels greater than 5 ug/dL; in Glenville (an east-side neighborhood in Cleveland, Ohio), that number is 26.5%.⁸² Ohio State University researchers estimate that if all children in Cleveland were tested, the number could be closer to 40%.⁸³ In Baltimore, between 1993 and 2013, 65,000 children were found to have blood lead levels greater than 10 ug/dL.⁸⁴ In 2012, the CDC announced that no blood lead levels are safe for children and that a blood lead level of 5 ug/dL was the new acceptable limit.⁸⁵ In 2013, in response to this change in the standard for blood lead level safety, Baltimore gathered data on children with blood lead levels of 5 ug/dL or greater and found that more than 1,000 children had levels between 5 and 9 ug/dL.⁸⁶

Many other cities deserve mention. In East Chicago, Indiana, levels of lead in the soil, which exceeded three or more times the federal safety standards, have forced 1,200 residents of a public housing complex to

⁷⁸ Kennedy, *supra* note 11.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ EPA ORDER, *supra* note 46, at 1.

⁸² Wines, *supra* note 65.

⁸³ *Id.*

⁸⁴ Anna Maria Barry-Jester, *Baltimore's Toxic Legacy of Lead Paint*, FIVETHIRTYEIGHT (May 7, 2015, 8:51 AM), <http://fivethirtyeight.com/features/baltimores-toxic-legacy-of-lead-paint/>.

⁸⁵ *Id.*

⁸⁶ *Id.*

relocate.⁸⁷ The cost for the relocation is an estimated one million dollars.⁸⁸ This soil was so contaminated because the housing complex was built on a site formerly used by a petroleum company that handled lead and arsenic.⁸⁹ Concerns of the presence of lead in public housing and water supplies have also emerged in Chicago, and about 170 water systems serving around 700,000 people throughout the state have exceeded the EPA standards for an acceptable amount of lead at least once since 2004.⁹⁰ These reports reflect the widespread and persistent presence of lead in communities throughout the United States. Because not all children are tested for lead poisoning,⁹¹ we do not know the full scope of its adverse impact.

III. LEAD POISONING SHOULD MITIGATE PUNISHMENT IN CRIMINAL SENTENCING

The law should consider lead poisoning and its neurological effects as a mitigating factor in the sentencing phase of criminal cases. Lead poisoning is widespread and the consequences are permanent. Medical research has repeatedly shown that lead damages developing children so severely that those with high blood lead levels have an elevated risk of criminal behavior throughout their lives.⁹² Criminal law should recognize this correlation in assessing the criminal responsibility of offenders.

⁸⁷ Merrit Kennedy, *Lead Levels are Forcing More Than 1,000 Indiana Residents to Relocate*, NAT'L PUB. RADIO (Aug. 31, 2016, 5:40 PM), <http://www.npr.org/sections/thetwo-way/2016/08/31/492108427/lead-levels-are-forcing-more-than-a-thousand-indiana-residents-to-relocate>. The residents in East Chicago, Indiana were primarily low-income. While the socioeconomic and racial implications of lead poisoning cannot be separated from the issue, this subject deserves an additional paper dedicated to the impact of lead on poor and minority communities specifically: "The relationship between lead and crime must be interpreted relative to sociologically relevant factors that impact exposure to lead such as ethnicity, race, and class." Paul B. Stretsky & Michael J. Lynch, *The Relationship Between Lead and Crime*, 45 J. HEALTH & SOC. BEHAV. 214, 214–15 (2004). See also ENVTL. PROT. AGENCY, 230-R-92-008, ENVIRONMENTAL EQUITY: REDUCING RISK FOR ALL COMMUNITIES, at 11–12 (June 1992) (noting that while researchers were not able to link racial differences in disease and death to environmental factors, lead exposure was the exception to the rule).

⁸⁸ Alexandra Silets, *East Chicago Lead Contamination Forces Nearly 1,200 from Homes*, CHI. TONIGHT WTTW (Sept. 14, 2016, 4:05 PM), <http://chicagotonight.wttw.com/2016/09/14/east-chicago-lead-contamination-forces-nearly-1200-homes>.

⁸⁹ *Id.*

⁹⁰ Michael Hawthorne & Jennifer Smith Richards, *Water Testing Finds High Lead Levels in Communities Across Illinois*, CHI. TRIB. (June 3, 2016), <http://www.chicagotribune.com/news/watchdog/ct-lead-water-illinois-met-20160512-story.html>.

⁹¹ Joshua Schneyer & M.B. Pell, *Millions of American Children are Missing Early Lead Tests*, *Reuters finds*, REUTERS INVESTIGATES (June 9, 2016, 2:00 PM), <https://www.reuters.com/investigates/special-report/lead-poisoning-testing-gaps/>.

⁹² See *infra* Part II.

Three features of current law support this proposition. First, using lead poisoning and its neurological effects (including ADD, aggressive and impulsive behavior, and diminished intelligence) as mitigating factors is consistent with the theories of punishment that underlie the criminal justice system. Retributive and utilitarian theories of punishment instruct against incarcerating or treating harshly offenders who are less culpable or would not be deterred by imprisonment.⁹³ Second, the effects of lead (and other neurotoxins) on criminal defendants are considered in capital cases as a mitigating factor during the sentencing stage of the case.⁹⁴ The consideration of lead poisoning in death penalty cases suggests that lead poisoning is relevant to sentencing in all cases. Third, the Supreme Court has used neuroscience in measuring the criminal responsibility of juvenile offenders, beginning in *Roper v. Simmons*, and more recently in *Miller v. Alabama*, signaling that neuroscience should help courts craft appropriate punishments for offenders.⁹⁵ In considering scientific data on childhood development, the *Miller* court suggested that the law should abide by evidence that shows an offender may have reduced responsibility or culpability for his or her criminal behavior.⁹⁶ Given how extensively lead poisoning and other neurotoxins have been shown to cause neurological harm to children and the permanent effects of this harm,⁹⁷ the law should consider evidence of lead poisoning for all criminal defendants—children and adults—as an expansion of the court’s willingness to consider scientific evidence about criminal defendants in *Miller* and *Roper*.

A. CONSIDERATION OF LEAD POISONING WITHIN THEORIES OF PUNISHMENT

Considering lead poisoning as a mitigating factor is consistent with the two primary justifications for punishment that underlie our criminal justice system. Utilitarian and retributive justifications provide a framework for determining whether, and how much, punishment is appropriate for an offender, based on the crime, the circumstances surrounding the crime, and the offender’s background.⁹⁸ In weighing the unique circumstances of each crime and offender, these theories provide guidelines for the appropriate level of punishment.⁹⁹

⁹³ See generally Berman & Hessick, *supra* note 47.

⁹⁴ AM. BAR ASS’N, *supra* note 22, at 956.

⁹⁵ *Miller v. Alabama*, 567 U.S. 460 (2012); *Roper v. Simmons*, 543 U.S. 551 (2005).

⁹⁶ 567 U.S. at 471.

⁹⁷ See *supra* Part II.

⁹⁸ See generally Berman & Hessick, *supra* note 47.

⁹⁹ The theories of punishment “provide a framework for identifying which facts and

The underlying theory of retributive punishment is that the offender is morally blameworthy and deserves to be punished.¹⁰⁰ To calculate how much punishment is deserved, retributive theory considers the degree of harm caused by the offender and his or her moral culpability.¹⁰¹ Lead poisoning implicates the offender's degree of moral culpability. Lead poisoning resulting in symptoms like ADD, aggression or behavioral disorders, or reduced intellectual capacity may impair the offender's ability to control his or her actions.¹⁰² Because of this, and because the offender may not fully understand the wrongfulness of his or her actions, the offender may be less morally culpable than someone who commits the same acts but does not share those impairments and fully comprehends his or her actions.¹⁰³ This conclusion necessarily suggests that a lead poisoned offender is less deserving of punishment and therefore justifies a reduced sentence.

In contrast to retributivist theory, the utilitarian theory of punishment asserts that the goal of punishment is to reduce crime through deterrence, incapacitation, and rehabilitation.¹⁰⁴ Utilitarians seek to deter crime by using punishment of one offender to dissuade others from committing the same crime in the future and to incapacitate and rehabilitate the offender in order to prevent him or her from committing additional crimes.¹⁰⁵ Deterrence works most effectively when the offender's actions were fully intentional and

circumstances should result in longer or shorter sentences. In other words, the theories of punishment provide a means for identifying aggravating and mitigating factors at sentencing." *Id.* at 177.

¹⁰⁰ *Id.* at 179, 183.

¹⁰¹ *Id.* at 180.

¹⁰² *See supra* Part II.

¹⁰³ "A defendant who suffers from a mental or physical defect that impairs her ability to appreciate the consequences of her actions is less culpable than a defendant who commits the same crime, knowing full well that the conduct is likely to harm another." Berman & Hessick, *supra* note 47, at 182.

¹⁰⁴ Berman & Hessick explain that

[d]eterrence theory seeks to decrease crime by using the threat of punishment to produce law-abiding behavior. If we set the punishment high enough, then it will discourage individuals from committing crimes Incapacitation theory seeks to reduce crime by making offenders incapable of offending again. Of course, any individual who has ever committed a crime has the potential to commit a future crime, and so one might think that incapacitation suggests indefinite detention for all defendants Rehabilitation theory argues that punishment should be used to modify an offender's behavior, thus decreasing her likelihood of reoffending. Rehabilitative punishment requires an individualized assessment of each offender in order to determine how punishment may be used to alter the offender's propensity to commit crime.

Id. at 183–84.

¹⁰⁵ *Id.* at 183.

is less applicable to offenders who commit crimes out of negligence or those who lack full awareness of their behavior.¹⁰⁶ Where lead poisoning causes neurological damage, an individual's actions may have resulted from intellectual or volitional impairment, and therefore, the intentionality of the act comes into question, thereby defeating the deterrent effect. Additionally, because medical research shows that the behaviors stemming from lead poisoning are medical or neurological in nature, incarceration may not be an appropriate method of rehabilitation. Again, rehabilitation is most applicable to criminal punishment where actors are fully in control of their actions and should be taught corrective behaviors. Without these goals of deterrence and rehabilitation being served, punishment cannot be justified under a utilitarian theory.

In reference to the utilitarian theory, Denno has presented concerns that there is a "double edged sword" in presenting evidence such as lead poisoning, where an offender is not fully responsible or cannot fully comprehend his or her actions.¹⁰⁷ The argument is that if the offender cannot be deterred or rehabilitated, courts will favor incapacitation to protect public safety.¹⁰⁸ However, these concerns are less persuasive in this context because lead poisoning does not render a person completely incapable of controlling behavior. Instead, lead poisoning should be considered as one factor among many that contributed to the commission of a crime and should be accounted for in relation to all other factors the court may consider. Where retributive and utilitarian rationales cannot justify punishment in consideration of the role lead poisoning played in the offender's crime, the poisoning should be taken into consideration in the sentencing phase, even if other factors suggest that punishment is still warranted. An offender who can prove he has suffered from lead poisoning deserves to have that fact considered by the court in determining an appropriate punishment. That is not to say that the offender should be declared blameless, but rather that considering the effects of lead poisoning provides a more comprehensive evaluation of the offender, thereby promoting fairness in the criminal justice system.

B. NEUROSCIENCE IN THE LAW: PRECEDENT AND JUSTIFICATION

Neuroscience already has a place in criminal law with regard to capital punishment.¹⁰⁹ It is not unusual for criminal defendants to raise neurotoxin poisoning as a defense or mitigating factor in such cases. Denno analyzed a

¹⁰⁶ *Id.*

¹⁰⁷ Deborah Denno, *The Myth of the Double-Edged Sword: An Empirical Study of Neuroscience Evidence in Criminal Cases*, 56 B.C. L. REV. 493, 496 (2015).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* at 493.

“Neuroscience Study” of 800 criminal cases where neuroscience was used during either the guilt/innocence phase or sentencing phase of a case.¹¹⁰ Most of these 800 cases involved defendants accused of murder, and neuroscience was used in discussions of the defendant in some cases, and the victim in others.¹¹¹ Denno found in her study that neuroscience has become so important in criminal cases, both to the prosecution and the defense, that advocacy based on it is expected.¹¹²

The Supreme Court has signaled the importance of neuroscience in non-death penalty cases as well. In *Roper v. Simmons*, the Court found, on the basis of scientific findings on the underdevelopment of young people’s brains, that the death penalty for children was unconstitutional.¹¹³ More recently, in *Miller v. Alabama*, the Court relied on neuroscience to hold that mandatorily sentencing children to life without the possibility of parole is unconstitutional.¹¹⁴ Writing for the Court, Justice Kagan identified the role neuroscience played in the Court’s judgment:

Our decisions rested not only on common sense—on what “any parent knows”—but on science and social science as well . . . [I]n *Graham*, we noted that “developments in psychology and brain science continue to show fundamental differences between juvenile and adult minds”—for example, in “parts of the brain involved in behavior control.” We reasoned that those findings—of transient rashness, proclivity for risk, and inability to assess consequences—both lessened a child’s “moral culpability” and enhanced the prospect that, as the years go by and neurological development occurs, his “deficiencies will be reformed.”¹¹⁵

The *Miller* Court relied on both the idea that children can be reformed or rehabilitated, and that they are not as morally culpable.¹¹⁶ This distinction is important because it suggests that the Court is not merely concerned with utilitarian rationales that weigh a person’s likelihood to re-offend or make rational decisions, but it also concerned with the inherent fairness of sentencing a person who may not be fully in control of their actions, and thus is not as morally blameworthy as somebody with full agency over their decisions. Therefore, the Court suggested that the retributive justification for punishment is weaker where an offender’s blameworthiness is

¹¹⁰ *Id.*

¹¹¹ *Id.* at 501.

¹¹² “[C]ourts not only expect attorneys to investigate and use available neuroscience evidence in their cases when it is appropriate, but they penalize attorneys who neglect this obligation.” *Id.* at 505.

¹¹³ 543 U.S. 551 (2005).

¹¹⁴ 567 U.S. 460 (2012).

¹¹⁵ *Id.* at 471–72 (citing *Graham v. Florida*, 560 U.S. 48, 68 (2010)).

¹¹⁶ *Id.* at 473.

questionable.¹¹⁷

Though the *Miller* court was specifically referring to juvenile life without the possibility of parole sentencing, a central principle of the Court's reasoning was that issues pertaining to brain development, even though not giving rise to a mental illness or insanity defense, should be factored into the determination about an offender's moral blameworthiness and, thus, sentencing.¹¹⁸ A guilty defendant's blameworthiness, in short, should affect the sentence. Because the retributive justification for punishment does not support unmitigated punishment of an offender whose actions stem from the consequences of lead poisoning, mitigation is appropriate for such offenders. Furthermore, and more broadly than in the context of children, *Miller* suggests that the law cannot ignore scientific data; it suggests that the law should be informed by the data such research produces.

Despite the use of neuroscience in this series of juvenile and capital cases, at least one scholar is concerned that using neuroscience to explain a criminal defendant's behavior may call into question a fundamental premise of criminal law and criminal liability: that actors generally make decisions with their own free will and should thus be held accountable for their actions.¹¹⁹ As Stephen Morse wrote, "[d]octrine and practice implicitly assume that human beings are agents, creatures who act intentionally for reasons, who can be guided by reasons, and who in adulthood are capable of sufficient rationality to ground full responsibility unless an excusing condition obtains."¹²⁰ To accept that humans cannot be held responsible for their actions because they are not acting of their own free will, some argue, would essentially undercut the law's purposes of guiding people's behavior and punishing people who go astray.¹²¹

While these concerns are valid, the consideration of neuroscience in determining criminal culpability does not necessarily overthrow the concept of individual responsibility. It instead presents us with the opportunity to create a more fair and reliable criminal justice system, which includes

¹¹⁷ See *id.* at 473–74.

¹¹⁸ See generally *id.*

¹¹⁹ See Stephen J. Morse, *Criminal Law and Common Sense: An Essay on the Perils and Promise of Neuroscience*, 99 MARQ. L. REV. 39, 40 (2015).

¹²⁰ *Id.*

¹²¹ Morse explains,

[l]aw is primarily action-guiding and is not able to guide people directly and indirectly unless people are capable of using rules as premises in their reasoning about how they should behave. Unless people could be guided by law, it would be useless (and perhaps incoherent) as an action-guiding system of rules.

Id. at 51.

considering moral culpability in fashioning an appropriate punishment.¹²² The next section shows that where lead poisoning is offered as a mitigating factor rather than a complete defense that negates mens rea and guilt, the general principles of free will and choice continue to govern the criminal justice system while shifting it to a more fair and accurate calculus of appropriate punishment.

C. LEAD POISONING AS MITIGATION IN CAPITAL CASES

The idea of including lead as a mitigating factor is supported by precedent. Presently, mitigation is an important component in the sentencing stage of offenses subject to the death penalty.¹²³ Unlike non-capital cases, where mitigation is not required of the defense, in capital cases, the defense must at least conduct an investigation to uncover any potential mitigating factors.¹²⁴ In fact, this requirement is so important that the American Bar Association has mandated it in its guidelines for the defense in capital cases.¹²⁵ According to those guidelines, a mitigation specialist must be included on a criminal defense team in order for the defense to meet their responsibility to “fully investigate the relevant facts.”¹²⁶

In 1978, the Supreme Court articulated the importance of mitigation, finding that

[a] process that accords no significance to the relevant facets of the character and record of the individual offender or the circumstances of the particular offense excludes from consideration in fixing the ultimate punishment of death the possibility of compassionate or mitigating factors stemming from the diverse frailties of humankind. It treats all persons convicted of a designated offense not as uniquely individual human beings, but as members of a faceless, undifferentiated mass to be subjected to the blind infliction of the death penalty.¹²⁷

This emphasis on mitigation suggests that such evidence is engrained in the consideration of justice and fairness in the criminal system, albeit with regard to death penalty cases specifically.

Lead poisoning has in fact played a part in death penalty cases. In *Lewis v. Dretke*, evidence of the defendant’s lead poisoning was sufficient to cause

¹²² Peter McKnight, ‘Neurolaw’ Changes the Landscape of Criminal Responsibility – Or Does It?, VANCOUVER SUN (Dec. 10, 2012), <http://www.vancouversun.com/technology/neurolaw+changes+landscape+criminal+responsibility+does+part/7669559/story.html>.

¹²³ See AM. BAR ASS’N, *supra* note 22, at 925.

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ Russell Stetler, *The Mystery of Mitigation: What Jurors Need to Make a Reasoned Moral Response in Capital Sentencing*, 11 U. PA. J. L. & SOC. CHANGE 237, 241 (2008) (quoting *Woodson v. North Carolina*, 428 U.S. 280 (1976)).

the Fifth Circuit to remand the case to the district court to address the defense counsel's failure to appoint a psychiatric expert to investigate the issue.¹²⁸ Lead poisoning has successfully been presented as a mitigating factor in at least two other cases.¹²⁹ The substantial breadth of mitigating factors considered in capital sentencing provides a model of what mitigating factors should be considered in sentencing for non-capital offenses. Of particular relevance for lead poisoning are three categories of impairment that the Supreme Court has taken into consideration: substantially impaired capacity, chemical brain poisoning, and brain damage.¹³⁰ These categories closely resemble the effects lead poisoning may have on individuals.

D. MITIGATING FACTORS IN STATE SENTENCING SCHEMES IN NON-CAPITAL CASES

The law should consider lead poisoning as a mitigating factor by developing sentencing schemes that include neurotoxins as a mitigation consideration. Sentencing guidelines provide courts with a framework from which to develop an appropriate punishment for offenders.¹³¹ Lawmakers specify a sentencing range for each substantive offense or class of offenses, with statutory guidelines specifying factors a court may consider in departing, upward or downward, from that sentencing range.¹³² Downward departures from the sentencing guidelines are appropriate where punishment would not serve the utilitarian or retributive justifications for punishment.¹³³

¹²⁸ 355 F.3d 364, 366 (5th Cir. 2003). On remand, the district court found that the defense had made a strategic decision not to appoint a psychiatric expert and raise concerns about lead poisoning, and thus the failure to introduce mitigating evidence of lead poisoning was proper. Importantly, however, the Fifth Circuit recognized that the defendant had the right to such an investigation. *Id.* at 367.

¹²⁹ See generally *Lewis v. Johnson*, 2000 WL 35549205, 93-CV-0329-G (5th Cir. Dec. 21, 2000) (unpublished); *Allen v. United States*, 2014 WL 2882495 (E.D. Mo. June 25, 2014).

¹³⁰ See generally Jeffrey Kirchmeier, *A Tear in the Eye of the Law: Mitigating Factors and the Progression Toward a Disease Theory of Criminal Justice*, 83 OR. L. REV. 631 (2004). Kirchmeier identifies trends in the court's consideration of mitigating factors. In reference to criminal brain poisoning, Kirchmeier cites to *Caro v. Calderon*, 165 F.3d 1223 (9th Cir. 1999), in which the court remanded the defendant's ineffective assistance of counsel claim to the trial court for an evidentiary hearing on the defendant's brain damage after exposure to pesticides as a migrant farm worker. *Id.* at 681.

¹³¹ U.S. SENTENCING COMM'N, AN OVERVIEW OF THE FEDERAL SENTENCING GUIDELINES, available at https://www.ussc.gov/sites/default/files/pdf/about/overview/Overview_Federal_Sentencing_Guidelines.pdf (last visited Jan. 21, 2018). State sentencing guidelines operate in a similar manner.

¹³² *Id.*

¹³³ See Berman & Hessick, *supra* note 47, at 165 ("Indeed, the very ideas behind the theories of punishment is the premise that punishment is illegitimate if it cannot be adequately justified.").

In considering the effects lead poisoning may have on offenders, sentencing guidelines and courts would be upholding the fairness and deterrence principles that underlie the criminal justice system.

Lead poisoning is generally not a factor that courts appear to consider during sentencing. Because lead is most concentrated in old homes in urban areas and in environments near old industrial factories that used lead, this Comment examines the sentencing schemes of several Midwestern cities in Michigan, Illinois, Indiana, and Ohio where the presence of lead is particularly high. Alone, these sentencing guidelines do not definitively show that courts may or may not consider lead poisoning as a mitigating factor, but when read together with each state's case law, it is not apparent that attorneys and courts are consistently considering lead poisoning evidence as mitigating.

1. Michigan

Michigan determines sentences using a scoring system.¹³⁴ The system lists variables, each worth a set number of points, and the sum total of those points determines the appropriate sentence length.¹³⁵ These variables do not include factors related to diminished capacity.¹³⁶ However, separately from these variables, a Michigan court may consider mitigating factors to reduce an offender's sentence as set forth in Michigan law such that the court may depart from guidelines if it is reasonable to do so.¹³⁷ The statute does not further specify what constitutes a "reasonable" basis for departure, and characteristics resulting from lead poisoning, such as ADD, diminished intellectual capacity, or behavioral disorders, are not clearly allowed or precluded by the statute.¹³⁸

2. Illinois

Illinois law enumerates a set of mitigating factors the court may consider in order to depart from the state's sentencing guidelines.¹³⁹ Three of the factors included for consideration may allow the court to consider evidence

¹³⁴ MICH. JUD. INST., STATE OF MICHIGAN SENTENCING GUIDELINES MANUAL (2015), https://sentencing.umn.edu/sites/sentencing.umn.edu/files/michigan_sentencing_guidelines_manual_sept_2015.pdf.

¹³⁵ *Id.*

¹³⁶ Primarily, the variables considered include whether a weapon was used in the commission of the offense, the harm to the victim, and whether the offender was under the influence of drugs or alcohol during the commission of the offense. *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ 730 ILL. COMP. STAT. ANN. 5/5-5-3 (2004).

of lead poisoning. First, the court may consider whether the offender had an intellectual disability, defined as “sub-average general intellectual functioning generally originating during the developmental period and associated with impairment in adaptive behavior reflected in delayed maturation or reduced learning ability or inadequate social adjustment.”¹⁴⁰ Second, the court may consider whether, at the time of the offense, “the defendant was suffering from a serious mental illness, which, though insufficient to establish the defense of insanity, substantially affected his or her ability to understand the nature of his or her acts or to conform his or her conduct to the requirements of the law.”¹⁴¹ Third, the court may consider whether “there were substantial grounds tending to excuse or justify the defendant’s criminal conduct, though failing to establish a defense.”¹⁴²

Given the data on lead poisoning and the brain damage it can cause, such evidence should qualify under any of these three provisions. Additionally, Illinois courts may consider non-statutory factors at a sentencing hearing.¹⁴³ This suggests that a court may take lead poisoning into account as a non-statutory factor. Despite the apparent allowance of this evidence under the statutory and common law in Illinois, including lead poisoning as an explicit factor would increase the likelihood that attorneys raise and courts consider such evidence.

If attorneys are raising lead poisoning claims, it is not readily apparent from a review of Illinois case law. However, attorneys have introduced evidence related to behavioral disorders that are associated with lead poisoning (though independently occurring in these cases) with mixed success. In a 2011 case before an Illinois Court of Appeals, the court affirmed the trial court’s finding that the defendant’s history of mental health problems were not mitigating.¹⁴⁴ In 2015, the same court similarly found that the trial judge did not err by failing to consider evidence of the defendant’s mental illness, reasoning that the court is not required to find significant mitigation in a defendant’s mental health.¹⁴⁵ Where mental illness did not independently require the court to mitigate a defendant’s punishment, the court was also not required to assign significant weight to evidence of lead poisoning.

¹⁴⁰ 730 ILL. COMP. STAT. ANN. 5/5-1-13. The full statute lists many other mitigating factors that are beyond the scope of this Comment’s consideration of lead poisoning.

¹⁴¹ 730 ILL. COMP. STAT. ANN. 5/5-5-3.

¹⁴² *Id.*

¹⁴³ *People v. Toliver*, 619 N.E.2d 1259, 1265 (Ill. App. Ct. 1993).

¹⁴⁴ *People v. Turner*, 2011 Ill. App. (4th) 101020-U, 35-37.

¹⁴⁵ *People v. Cooper*, 2015 Ill. App. (1st) 130884-U, ¶ 41, *appeal denied*, 50 N.E.3d 1140 (Ill. 2016).

3. *Indiana*

Like that of Illinois, Indiana law enumerates a number of factors that may be considered to mitigate a sentence, and also as in Illinois, those factors do not specifically include lead poisoning or the full range of symptoms related to lead poisoning. However, an Indiana court may consider “substantial grounds tending to excuse or justify the crime, though failing to establish a defense.”¹⁴⁶ In 2006, the Indiana Supreme Court reaffirmed a 1995 decision that clarified what mental health evidence could be considered during sentencing as mitigation, finding it appropriate for the court to evaluate the extent to which the offender cannot control behavior, the severity of effects, the duration of the illness, and the extent to which the illness played a role in the crime.¹⁴⁷

4. *Ohio*

In Ohio, a presentence investigation report (PSI) guides a court’s decisions about mitigating and aggravating factors in sentencing. The PSI may consider an offender’s social history and present condition, and a physical and mental examination.¹⁴⁸ Ohio’s statutory law does not provide a list of specific criteria the court may consider as mitigating factors in sentencing. Instead, the presentence investigation provides the court a means for considering the defendant individually before sentencing.¹⁴⁹ Because the presentencing report calls for a physical examination, if a defendant’s blood is tested, the results may show whether a defendant has a significant blood lead level.¹⁵⁰

While the statutes of these states do not prohibit a court from taking lead poisoning into account, it remains unclear whether their courts are willing to

¹⁴⁶ IND. CODE ANN. § 35-38-1-7.1(b)(4).

¹⁴⁷ *Covington v. State*, 842 N.E.2d 345, 349 (Ind. 2006). The Indiana Supreme Court added that

[t]he American Psychiatric Association’s definitions of mental illness, contained in the Diagnostic and Statistical Manual of Mental Disorders (presently DSM–IV) have continued to expand to the point that a recent study declared that about half of Americans become mentally ill and half do not. This suggests the need for a high level of discernment when assessing a claim that mental illness warrants mitigating weight. In *Weeks v. State*, we laid out several factors to consider in weighing the mitigating force of a mental health issue. 697 N.E.2d 28, 30 (Ind.1998). Those factors include the extent of the inability to control behavior, the overall limit on function, the duration of the illness, and the nexus between the illness and the crime.

Id.

¹⁴⁸ OHIO REV. CODE ANN. § 2947.06 (2004).

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

extend mitigation to factors like diminished capacity or behavioral disorders resulting from lead exposure. It is possible that this Comment's review of case law in these states does not reflect the practices of defense attorneys. If attorneys are not raising issues of lead poisoning specifically, there is at least some indication that they are raising defenses related to neurotoxins generally.¹⁵¹ However, the effects of lead poisoning are sufficiently important that the possibility of lead poisoning as a mitigation factor should be clearly provided for in the law.

Sentencing statutes should be reformed to include explicit evidence of lead poisoning and its effects as one of the mitigating factors. This is warranted given how serious the effects of lead poisoning can be on an individual; obligating courts to consider such evidence promotes fairness and justice in criminal law. The inclusion of lead poisoning in mitigation statutes would have other benefits as well. First, given the controversy still surrounding neuroscience and criminal responsibility, requiring courts to consider this evidence would provide judges a measure of insulation from criticism.¹⁵² Second, explicit language would serve as a reminder to defense attorneys to look into lead poisoning, a reminder that would be especially important because lead poisoning evidence has not historically been used in non-capital criminal cases, so attorneys may be unaware of the medical consequences of lead exposure.

CONCLUSION

Our criminal law system is founded upon principles of fairness and justice. By considering the effects lead poisoning has on individual actors—causing diminished intellectual functioning, behavioral disorders, ADD, increased aggressive behaviors, lack of impulse control, and more—a court can more accurately evaluate the moral culpability of those who break the law. In doing so, the court would further advance the principles of fairness

¹⁵¹ See Francis X. Shen, *Legislating Neuroscience: The Case of Juvenile Justice*, 46 LOY. L.A. L. REV. 985, 989 (2013) (citing to two juvenile public defenders in Virginia who report that they use brain science “all the time on a variety of issues—transfer/certification, correctional versus non-correctional sentences, *Miranda*, accomplice liability, applicability of adult sentencing guidelines . . . Basically, we try to work it in whenever we can.”).

¹⁵² As Berman & Hessick explain, some judges decline to reduce defendants' sentences. And the history of modern sentencing reform make judges especially hesitant to champion mitigating factors absent legislative guidance: using sentencing discretion to choose whether to treat a fact as mitigating or aggravating based on personal philosophies, the argument goes, risks taking the first step on a path returning us to the bad old days, when sentencing was ‘lawless’ and outcomes were persistently unpredictable and inconsistent. Hessick & Berman, *supra* note 47, at 164.

and justice that underlie the court's purpose. Flint and the many other cities across the nation dealing with lead contamination in their communities serve as a reminder that lead is no small problem that can be ignored. It is estimated that over half a million children have blood lead levels that pose a risk of danger to their health.¹⁵³ Although a dangerous blood lead level in a child does not necessarily mean that the child will become involved in the criminal justice system, it is important that criminal law should nonetheless account for lead poisoning, particularly given its widespread prevalence in urban communities.

Data showing that individuals with lead poisoning are more at risk of becoming involved in the criminal justice system—not only as children, but well into adulthood—serve as a reminder that lead poisoning is not a problem that can be disregarded by the criminal justice system. Because our retributive and utilitarian rationales for punishment—moral blameworthiness, deterrence, rehabilitation, and incapacitation—are not well served by harshly punishing those who lack full responsibility for their crimes, the criminal law has an obligation to consider lead poisoning in instances where it has resulted in diminished criminal responsibility of the defendant. Affording evidence of lead poisoning some weight in the formulation of a fair and just punishment is consistent with both retributive and utilitarian goals.

This Comment does not propose considerations completely novel to criminal law. Instead, consideration of lead poisoning as a mitigating factor in the sentencing of non-capital criminal cases builds on current legal practices regarding mitigation.¹⁵⁴ Courts consider evidence of lead poisoning during the sentencing stage of death-penalty eligible cases.¹⁵⁵ As noted above, such evidence is of such critical importance to a fair trial that an attorney's failure to investigate or present this evidence may constitute ineffective assistance of counsel.¹⁵⁶ Consistently with this, the Supreme Court affirmed the importance of neuroscience in determining criminal responsibility and in assigning fair and appropriate punishment for defendants with cognitive impairments.¹⁵⁷

It is unclear how many attorneys are already raising claims of lead poisoning to advocate for mitigated punishment and how many courts are accepting such evidence if presented to them.¹⁵⁸ But the numbers and data in

¹⁵³ See *supra* Part I.

¹⁵⁴ See *supra* Part IV.

¹⁵⁵ See *supra* Part IV.

¹⁵⁶ See *supra* Part IV.

¹⁵⁷ See *supra* Part IV.

¹⁵⁸ See *supra* Part IV.

this Comment have shown that the consequences of lead poisoning may so significantly impact an offender's level of criminal responsibility that attorneys and courts should not risk oversight of this evidence. Sentencing schemes that explicitly reflect the effects of lead poisoning provide defense attorneys and courts with an important reminder to investigate whether a lesser sentence may be appropriate for an offender with a history of lead poisoning.

Nationwide attention to the Flint water crisis, where the media has drawn the public's eye to the health problems and risks of delinquency caused by lead poisoning, provides a timely and important opportunity to undertake serious examination of the criminal law's responsibility to consider lead poisoning. A sentencing scheme that includes lead poisoning as a mitigating factor would not undermine the notion of individual free will, which the criminal justice system relies on, because lead poisoning would be weighed among many other factors contributing to the formulation of the offender's punishment. Adoption of clearer rules on lead poisoning, such as including lead poisoning as a mitigating factor in sentencing schemes, would support the individualized consideration of punishment that is fundamental to fairness and justice.

